

NATIONAL DOCKS BRANCH BRIDGE N.D.2F

(Conrail Bridge 2.77)

Spans the former Central Railroad of
New Jersey, west of the New Jersey Turnpike
north of Communipaw Avenue near
Johnson Avenue
Jersey City
Hudson County
New Jersey

HAER No. NJ-104

HAER
NJ
9-JERCI,
21-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service
Northeast Region
Philadelphia Support Office
U.S. Custom House
200 Chestnut Street
Philadelphia, P.A. 19106

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Location: Spans the former Central Railroad of New Jersey, west of the New Jersey Turnpike, north of Communipaw Avenue near Johnson Street Jersey City, Hudson County, New Jersey

UTM: 18.579710.4506730
QUAD: Jersey City, New Jersey 1:24000

Date of Construction: 1908

Engineer: Office of Bridge Engineering, Lehigh Valley Railroad, South Bethlehem, Pennsylvania.

Fabricator: American Bridge Company, Edge Moor Plant, Edge Moor, Delaware

Present Owner: Consolidated Rail Corporation (Conrail), 2 Commerce Square, P.O. Box 41411, Philadelphia, PA 19101

Last Use: Railroad bridge, abandoned.

Significance: Bridge N.D.2F is significant as a highly intact and representative example of a riveted Pratt through truss railroad bridge, typical of late nineteenth and early twentieth century bridge engineering. In its construction, this skewed, two-span bridge demonstrates the shift from pin-connected railroad bridges to riveted steel truss construction in the face of the increased weight and speeds of locomotives and rolling stock during this period.

In addition, the construction of Bridge N.D.2F and the history of the National Docks Branch (NDB) evidence the rapid expansion of northern New Jersey port facilities and the competition among rail lines to provide access to these lucrative markets.

Project Information: This documentation has been submitted in accordance with an agreement between the New Jersey State Historic Preservation

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Office and the New Jersey Transit Corporation (NJ TRANSIT), concerning the Wilson Street Extension Project, which will require demolition of Bridge N.D.2F. On February 17, 1995, the New Jersey State Historic Preservation Office issued the opinion that Bridge N.D.2F was eligible for inclusion in the National Register of Historic Places. Due to the abandonment and subsequent infill of the Central Railroad of New Jersey right-of-way crossed by Bridge N.D.2F, there is no longer a need for a bridge at this location. In addition, due to the size and extreme skew of this two span bridge, relocation and reuse was not considered feasible.

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Bridge N.D.2F was constructed to carry the National Docks Branch (NDB) single track line over the twelve tracks of the Central Railroad of New Jersey (CNJ). The NDB linked the National Storage Company's inland facility in Jersey City, New Jersey to their terminal facility in the area known as "Black Tom," so named for a prominent rock once exposed on the site. Bridge N.D.2F, located at mile 2.77 of the current Conrail National Docks Branch, lies immediately west of the New Jersey Turnpike Viaduct and north of Communipaw Avenue on former coastal lands, filled in the late nineteenth and early twentieth centuries for the development of port facilities at Jersey City.

The present bridge consists of two unequal spans determined by the then existing alignment of the CNJ tracks and the location of the center pier of the 1882 structure. Both east and west spans of the bridge are riveted, Pratt through truss spans specified to be constructed of "soft open hearth steel." Construction details of the two spans are identical: both east and west trusses are 30 feet in height from center of the bottom chord to center of the top chord; the trusses are set 17 feet 8 inches center-to-center, providing a clear height of 22 feet from rail top to portal bracing and a clear width of 15 feet 9 1/2 inches.

The trusses of the west span are of equal length -- 168 feet 1/4 inch center to center of the bearing pins -- consisting of nine panels. Due to the difference in skew between the center pier and the east abutment, the north and south trusses of the east span are unequal, being 206 feet 1/4 inch on the north (11 panels) and 196 feet on the south (10 panels) respectively, center-to-center of the bearing pins. Total length of the structure at the centerline is 356 feet 0 inches. The top chord members are box sections of channel and riveted steel plate; the bottom chord is of an open box construction with continuous channel sections connected at intervals, top and bottom, by riveted steel plate. The diagonal members at the ends of each chord continue the construction shown in the top chord. The vertical and remaining diagonal members are of channel sections connected by riveted bar lattice, with the exception of the center panels of each truss where lighter cross-bracing of back-to-back angles are placed in tension.

The wooden ties and track are carried on paired stringers running between transverse floor beams corresponding to the posts of the trusses, 20 feet 2 1/4 inches center-to-center on the west span and 19 feet 6 1/2 inches center-to-center on the east, for standard truss panels. The dimensions and floor beam placement of the end panels vary to accommodate the skew of the abutments. The floor beams are 22 inch deep "I" section built up of riveted angle steel and plate, connected to the bottom truss chords by riveted angle sections. The similarly constructed stringers are 7 feet 0 inches apart and attached by riveted angles to the web of the floor beams.

The trusses are stabilized at the top by sway frames composed of back-to-back angle sections between vertical members, and cross-bracing between the top chords of "I" section with lattice web. Further cross-bracing is found between the floor beams, below the stringers. In addition,

the long portal braces dictated by the skew are themselves constructed as small trusses, providing lateral reinforcement in these areas.

As originally constructed, the bridge structure was supported at each end on stone masonry abutments through pin-type bearings. The center of the structure was supported by a steel bent composed of built-up piers topped by paired plate girders bearing the east and west spans. The foundation for this support was a concrete bearing on a steel grillage footing.

Alterations to the bridge have been minimal and were made to address deterioration of the structure and foundation. Repairs in 1931 strengthened portions of the lower chords, floor beams and stringers of the east span. The scheduled work called for reinforcement by riveted plate and angle of areas located above CNJ tracks No. 1 and No. 6.

Additional work undertaken by Conrail in 1981 strengthened the west abutment and bearing points by inserting a steel armature and encasing the masonry with concrete. At this time, the original pin bearings were replaced by bronze plate expansion bearings with grease fittings to allow for horizontal movement. Selected columns were also strengthened to allow the transfer of weight to temporary shoring during this work.

HISTORY OF BRIDGE N.D.2F AND THE NATIONAL DOCKS BRANCH

In 1876, the National Storage Company, a company with ties to the Pennsylvania Railroad (PRR), acquired a parcel of largely tidal land south of the present Communipaw section of Jersey City, New Jersey. Filling and the acquisition of additional parcels provided the company with an approximately 100 acre waterfront site on which it built an oil terminal, known as the Black Tom Terminal for Black Tom Rock, formerly exposed on the site.

In 1880, right-of-way purchases and surveys were completed for a rail line, the National Dock Branch (NDB), from the new terminal site to the National Storage property approximately one and one-half miles inland, to the north-west. This mostly elevated line was purportedly intended as a connector between the PRR and the new oil terminal facility but was clearly also a part of the PRR's plan to develop the new terminal at Black Tom.

Competition for access to the northern New Jersey shore and the potential development of commercial maritime facilities occasionally led to conflicts over rights-of-way. The proposed NDB needed to cross the CNJ tracks running north-south along the shore, a right the CNJ was not eager to grant the NDB and its parent PRR. This dispute was resolved in the courts, with the NDB granted the right to construct a two-span bridge over the multiple CNJ tracks. Constructed in 1882 (Cofrede and Saylor, Engineers and Bridge Builders, Philadelphia), this pin-connected, through truss bridge was the predecessor of the present Bridge N.D.2F.

In 1887, when the Lehigh Valley Railroad (LVR) began development of a terminal facility at the Morris Canal Big Basin in Jersey City, it recognized the benefits of using the new line to access its property. To secure this access, the LVR acquired one-half interest in the NDB in 1890. By 1892, the LVR had completed a bridge across Newark Bay and had installed additional trackage to connect its new Jersey City Terminal via the NDB.

Construction of the Greenville and Hudson Railway by the LVR in 1899 provided a new route to LVR's Jersey City Terminal relegating the NDB to its original connecting line function. The LVR had not lost interest in the line, however, and in that same year purchased the remaining 50% interest in the NDB, as well as the National Storage Company. Although wholly owned by the LVR, the NDB retained its corporate identity and was operated independently of the LVR's main line which it now paralleled in Jersey City.

Bridge N.D.2F was constructed in 1908 to carry a single track of the LVR National Docks Branch (NDB) over multiple tracks of the CNJ on approximately the same alignment. Bridge N.D.2F was constructed after the earlier bridge was found structurally inadequate for the new 100,000 lbs. rated LVR coal cars and heavier locomotives. In addition, construction of the new bridge aligned the two spans, eliminating the seven degree curve carried by the 1882 bridge.

The design of Bridge N.D.2F was handled in-house by LVR's Bridge Engineering Division, South Bethlehem, Pennsylvania, with construction drawings, stress analysis, fabrication and erection by the American Bridge Company, Broadway, New York City. The American Bridge Building Company, the successful bidder of seven competing firms for Bridge N.D.2F, was formed in 1900 through the merger of 30 of the largest bridge building companies in the East. Bridge N.D.2F was fabricated at the American Bridge Building Company's Edge Moor plant, formerly the Edge Moor Iron Company located on the Delaware River in Wilmington, Delaware. Such large, consolidated firms as the American Bridge Building Company had the resources to keep up with the latest technological developments and to produce such large span bridges within demanding project time limits, in this case, a five month construction period.

Under the auspices of the Port Authority of New York and New Jersey, created in 1921 to improve operation of the numerous New York City area port facilities, the NDB was administratively joined in 1926 with the New Jersey Junction Railroad and several smaller lines as the Marine Railroad No. 13. Such Port Authority intervention was strongly resisted by the railroad companies and this administrative consolidation was the only such implementation. Continued resistance by the railroads led to a gradual dissolution of this administrative merger and a return to autonomous operation by the individual lines.

In 1968, the merger of the New York Central Railroad and the Pennsylvania Railroad into the giant Penn-Central meant renewed importance for the NDB. The Penn-Central began to send all its east-west freight north to the Selkirk Yard near Albany, then across the Hudson River by

bridge, instead of floating it on car floats across the bay from Jersey City. To reach Selkirk, traffic from the former Pennsylvania RR line had to move onto the former New York Central West Shore Line. One of the chief routes for this movement was via Oak Island Yard and the National Dock tracks to the New Jersey Junction Railroad and the Weehawken Terminal. This route continues to be used today by Conrail.

After the abandonment of service to the Central Railroad of New Jersey Jersey City passenger and ferry terminal in 1967, the CNJ Railroad passenger approach right-of-way was filled, including the portion spanned by Bridge N.D.2F. To eliminate costly bridge maintenance and to eliminate speed restrictions imposed by Bridge N.D.2F and its approaches, the CNJ constructed a parallel track bypassing the bridge.

Bridge N.D.2F is significant as an example of a severely skewed riveted Pratt through truss bridge constructed during a period when truss bridges were the cheapest and most efficient method of constructing spans of more than 100 feet in length. Metal truss forms were in wide use between 1860 and 1890, after which plate girders dominated railroad bridge construction. Out of the number of truss types developed during the nineteenth century, the Pratt truss was predominant in railroad bridge building by the end of the century. After 1920, the simpler and more economical Warren truss type became predominant. As per the 1991 *NJ Transit Historic Railroad Bridge Survey* conducted by DeLeuw Cather & Co. and NJ TRANSIT, only nine through truss bridges remained on NJ Transit's commuter rail lines. Although a comprehensive survey of historic railroad bridges to include freight lines has not been conducted, a similar loss of historic railroad truss bridges throughout the state may be assumed following upgrading projects in the early decades of this century.

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Location Map:

